

NIEHS News

Rural Coalition Meeting

Kenneth Olden, NIEHS director, addressed members of the Rural Coalition on Environmental Health at their annual meeting in March at the historic Penn Center in South Carolina. The rural coalition, a multicultural, national alliance of organizations concerned with rural needs and issues, is committed to grassroots solutions to rural problems. Among the issues the coalition addresses are the health concerns of many rural communities faced with exposures to pesticides, hazardous waste, nuclear materials, and other environmental hazards.

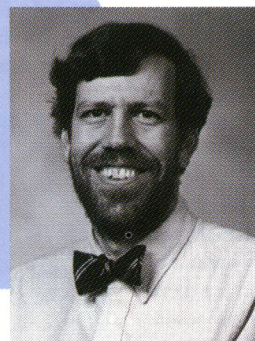
Olden, a federal leader on issues of environmental justice, the concern that lower socioeconomic groups and minorities suffer greater exposure to pollutants and their associated health effects, told the more than 200 participants at the Rural Coalition meeting, "NIEHS is committed to a new paradigm for environmental health research, one that includes high-risk communities and workers as active participants in all aspects of the research venture."

NIEHS to Study Developmental Effects of Pesticides

In 1988, Congress asked the National Academy of Sciences to review the policies and issues surrounding the question of pesticides in food and, specifically, to find out what is known about infantile and juvenile exposures to food-borne pesticides, the

adequacy of the current risk assessment procedures, and to identify the most significant toxicologic issues. The NAS convened a panel which released its report in the spring of 1993. The panel found significant differences between the diets of children and adults, quantitative and qualitative differences between children and adults in their susceptibilities to chemical toxicities, as well as the extents of their exposures to pesticides.

That is, compared to adults, children are exposed to different amounts of pesticides as well as to a different mix of pesticides. Their exposure to turf chemicals, for example, can be much higher than adults. Additionally, the responses of children to a compound can differ both in kind and magnitude. This is because of the postnatal development that occurs in certain organ systems of humans; alterations in some developmental steps can result in long-term changes in the function of the affected organ. For example, exogenous compounds can delay or hasten the time when testicular Sertoli cells stop dividing, which can result in adult testes that are larger or smaller than normal. Similarly, in the brain, each developmental step builds upon the ones preceding it, so if an alteration in an early step leads to altered neural network formation, decreased learning ability results.



Robert Chapin

The panel identified three systems as being of special concern, because they undergo substantial development during the early years of life: the central nervous system, the immune system, and the reproductive system.

The panel found that human protection from pesticide risks was based on toxicology data taken from adult animals. The extrapolation of toxic effects data from adult

test animals to juvenile humans clearly leaves open the possibility that some adverse effects, particularly effects on developing body systems, might be overlooked. The panel noted that there are huge data gaps in this area and concluded that there have been too few studies in juveniles to justify the continued use of adult data to estimate hazards in juveniles. Even in the relatively small database that exists, the panel found suggestions of significant differences in responses of juveniles and adults.

The panel called for changes in regulatory practices and for a systematic evaluation of the relative risks to juveniles and adults. In response, Robert Chapin and his colleagues in the Reproductive Toxicology Group of the Environmental Toxicology Program are designing a study to address this issue. Although initially focused on the reproductive system, the study has been expanded to include evaluations of central nervous system effects and effects on immune system function. These additional studies will be carried out in collaboration with investigators at EPA's Health Effects Research Laboratories. Ginger Moser, Stephanie Padilla, and Robert McPhail will evaluate the central nervous system effects, and Ralph Smialowicz will assess immune system function.

Pregnant female rats will be dosed for the last trimester of pregnancy through the seventh day after birth, and the offspring will be exposed directly. Neurotoxicity, reproductive and immune toxicity will then be assessed at critical stages of offspring development. In addition, some mothers will be milked to determine the amount of test chemical (or its metabolites) in milk. This will provide some information on the amount of test chemical to which the offspring are exposed during their first week of nursing. Some indices of general milk quality will be measured as well.

Animals in the neurotoxicity studies



Coalition building. (left to right) Carlos Marentes of Sin Fronteras Organizing Project, Mary Lee Johns of Oyati Zani (Healthy People), Director Kenneth Olden of NIEHS, Executive Director Lorette Picciano-Hansen of the Rural Coalition, and Pat Bellanger of the American Indian Movement.